Henderson, David 2003

Dr. David Henderson Oral History 2003 B

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Dr. David Henderson

February 10, 2003

This is an interview with Dr. David Henderson. The date is February 10, 2003. The place is Bethesda, Maryland, on the NIH campus. The interviewer is Jessie Saul.

Henderson: So if I were going to recast what you just told me, I would think that you might have left one thing out. So there's the safety of the blood or blood products for the public; there's the safety aspects in the healthcare setting; there's the safety aspects in the laboratories where they're working with the pathogens and blood products; and then post-exposure management strategies. So I'm expert, if anything, about the clinical aspects and the post-exposure management stuff.

Saul: All right. I've read the interview that you did with Dr. Victoria Harden, and it was very interesting and enlightening, so I won't cover most of the same that they've done, a lot of your past educational history, your experience with those kinds of things. I'm really interested in specifically the needle-stick studies that you did and, as hospital epidemiologist, how your knowledge evolved about who was at risk for this, how were hospital staff at risk for what practices, what kinds of things we need to do to do that.

So I have your educational history from the other transcript. If you want to start. My questions start really with sort of you were at the first -- the first time you heard about the new disease, you went to the Infectious Disease Society meeting, and it was discussed there. If you want to just tell me, sort of starting at that point, if that seems like a good point to you, explain to me sort of, how did your knowledge about the disease evolve, particularly from the perspective of an epidemiologist?

Henderson: Well, I think my first interaction with the disease, I wasn't even aware that I was interacting with the disease. I think our first patient was admitted,

I'm not absolutely certain about the timing of this, so you'll have to go back and look. It may have been that the meeting you're talking about was a meeting in the fall of 1980. All right? I'm not sure.

Saul: I don't have my dates with me.

Henderson: So if the ID meeting -- ID meetings are always in the fall, so if the ID meeting was, if it was the fall of 1980, then that was the first I had heard about this disease.

But I really came home to roost, for me, in April of 1981, and I'm relatively certain of that date. We had a patient admitted to the hospital with this disease. We didn't know it was this disease, and they got together a whole bunch of folks to look at the patient and talk about what the patient might have and what we ought to do. And I was mostly fascinated by the intellectual aspects of that discussion as opposed to thinking about occupational risks.

In June of 1981, the first salvo was fired in the medical literature, which was the CDC's *Morbidity-Mortality Weekly Report*, June 6, I think, 1981. And if you look at that issue, go back and look at that issue, it wasn't even thought to be important enough to make it the lead article in the issue. It's at the very end. It's just entitled "Pneumocystis Pneumonia, Los Angeles." And so those were Mike Gottlieb's [sp.] cases described. And there was some concern about what that was.

The momentum really picked up, and I think, really, sort of when we began engaging on sort of the transmission aspects of the disease might have been in the fall of 1981.

Saul: Transmission from patients to?

Henderson: Just the transmissibility. I mean, it looked like something was happening. No one had too much of a clue about it. And the early literature started unfolding describing this syndrome, and then there were meetings at the Infectious Disease meeting. There was a special symposium about it and people started thinking about it.

Then the Public Health Service held a meeting, and I don't remember when that meeting was, but I bet Vicky Harden knows when that meeting was. It was held in Rockville at what was then the Holiday Inn. It's not a Holiday Inn anymore, I don't think. It's across from Congressional Plaza. So, whatever that was called at that time. Several folks from NIH went, including Al Saah, who worked in the Epidemiology and Biometry Program. And sitting in the meeting, it became clear to me that we were going to have lots more of these people with this disease in my hospital, because that's the nature of my hospital; and, secondly, that no one knew anything about occupational risk. People were only talking about community risk.

And so I then had a series of conversations with good friends and collaborators that I had learned from over the years at CDC about those risks and asked about that risk, and basically they didn't know. I think some of them had thought about it, but… So Dr. Saah and I basically sat down and sketched out the initial needle-stick study.

Saul: Tell me more about the needle-stick study. How did you decide you wanted to do a needle-stick study as opposed to something else?

Henderson: Well, it wasn't just a needle-stick study. It was, I mean, it was an extensive study, and somewhere I think we maybe even now have thrown away those questionnaires. But we didn't know what the risk might be, and so we designed a really broad-based epidemiological study that would capture exactly what you as a healthcare worker were doing in the hospital and then put blood away periodically. We assumed that somewhere downstream, someone would develop a test for this disease, and then, at least retrospectively, we could go back and, by making epidemiological comparisons, figure out what sorts of things might have put you at risk.

So we had a hint, okay, because of the epidemiology in the community of hepatitis B, and these diseases seemed to travel together, so, I mean, if you looked at the populations at risk for hepatitis B in the community, there were people who had blood exposures and sexual exposures. That's what this disease looked like initially. I mean, there were these groups of folks that were identified as apparently being at risk, and those mapped almost exactly with what you would expect for a blood-borne and sexually transmitted disease.

Saul: And it looked like hepatitis B to you because you were an epidemiologist and that's the kinds of things you were looking for? Because I've talked to other people who say, "Well, yes, if you look at it from a certain perspective, it could have looked like hepatitis B. There was a lot of a theory that talked about immune system overload, and that it was just toxins in the system or foreign proteins or...

Henderson: Well, there were a lot of issues that were raised like that, but then you have trouble explaining the transfusion cases and some other cases where that doesn't make a lot of sense, and so, I mean, if you're looking for economy of diagnosis, I think you would have thought sort of the most, the thing that fit the model best was sort of the hepatitis B model. But we were all-inclusive. We included, I mean, did you do things that created aerosols, did you do things that . . . And so we had all this data entered into a data set, and then basically we were just waiting for a blood test.

Saul: So what kinds of things did you include in the questionnaire?

Henderson: It was entirely occupationally based. I mean, we did ask people up front if they were aware -- at least it's my recollection, and this is a long time ago now and I don't remember specifically -- but I believe we asked people to tell us whether or not they thought they might be at community-based risk for this disease so we could exclude community confounders sort of up front. But we asked, if you're a nurse working at the bedside, did you draw blood, did you start lines or did you change linen? How many times during a week did you get your hands contaminated with blood, did you get your hands contaminated with stool or did you get your hands contaminated in other ways. So we could go through, and we had a huge data set because there were 500 or 600 hundred nurses working in the hospital, and most of them anxious enough about this disease that they would be able to fill out these really unbelievably 60-some-page questionnaires periodically to give us the data, and so we really had an elegant data set. As it turns out, most of those . . .

Saul: Was it just nurses?

Henderson: No. We did it with any patient-care provider who wanted to participate. But the most robust data set was the nurses.

Saul: And was it just nurses who were dealing with patients?

Henderson: No. And you wouldn't want that, would you?

Saul: No.

Henderson: No. That's right. So we wanted all of the nurses to participate. And there was enough, I think, angst in the air that even those who weren't providing care for them had concerns, and so were able or willing to participate. So we had quite a nice data set.

And it turned out, just to cut to the chase, that once we got the data, first we got scooped by -- and please don't write this, but just so you know it -- Marty Hirsch of Harvard, I think, heard that we had a study that was much larger. I mean, so we had, I forget, a hundred and some, 170, 180 exposures in 800 people, a different kind of study than he had, and he had 25 or 30 people who'd had needle-stick exposures. But he was somehow able to persuade Dr. Gallo and his collaborators to do their samples before we could get them persuaded to do ours, else my paper would have probably been published in the *New England Journal* rather than the *Annals of Internal Medicine*. The paper that he published wasn't the paper I wanted to publish. I wanted a broader epidemiological assessment of what these risks might be and whether it was just needle stick or likely to be other things, and what people did, hopefully, to prevent transmission. And that was the way the study was designed.

Saul: So his study was just on needles.

Henderson: Yes, a very small number.

Saul: And what did it show?

Henderson: It showed none of, I think, none of 18 or none of 20, or something like that, people who had had occupational exposures by needle-stick got infected. All right? The early tests were crummy. Right? And when we first got our results back, there were lots of positives. And just a quick and dirty look at them suggested that the positives in the study might actually associate at some level with extent of exposure to the patients and or specimens. Scared the hell out of me.

I went to a meeting in Building 1 with those data, and what we really needed, remember, in those days you did an Elisa and then a Western blot for confirmation. The Elisa's, I mean, the way these tests worked, in a very low-risk population, the likelihood that any positive is a true positive is very small because it's an insensitive test, and so you need confirmation. If you're looking in a very high-risk population, the likelihood that a positive is a true positive is much higher, but in a low-risk population, it's very low. But we didn't know, because by then the Gallo factory was just berserk with work, we couldn't get them to do Western blots for us.

So the spin-out of the meeting in Building 1 was that they called folks and finally got those Western blots done, and there were no positives. None of the positives were positive.

Saul: Thank goodness.

Henderson: Right. So that first set, they had zero. Then we were beginning to get sort of some idea about the magnitude of risk.

Saul: Okay. Let me go back. When you talked about the first patient you admitted, they had strange and unusual symptoms.

Henderson: Right. This patient was not admitted to the Cancer Institute's medicine branch. It was admitted to Tom Waldmann's service. Tom Waldmann is an internationally famous immunologist. And he was admitted because he had a very unusual acquired immune deficiency that no one had ever seen before, and Tom is probably, in the world, might be among the most noted immunologists who understand immunodeficiencies, so, yes.

Saul: That's why he was admitted there.

Henderson: Yes.

Saul: At that point, what kinds of safety procedures were in place?

Henderson: Nothing, literally nothing. And, in fact, I mean, we had already at that point in our evolution of hospital epidemiology in the Clinical Center, I think we had a pretty good infection-control program. The risks associated with blood, I think, were at that point entirely underappreciated. So we did have blood precautions for patients who had blood-borne hepatitis syndromes, but that was all. And there were no…

Saul: Precautions?

Henderson: Blood precautions were the precursor, really, to what we now call universal precautions. Or standard precautions, I guess, in the current genre. You know, don't get blood on your hands unnecessarily; put a barrier between you and the blood, and those sorts of things; wear gloves; and avoid splashing, splattering, and so on. But I don't think anybody was looking at that particular patient with an eye toward transmission or transmissibility.

Saul: So the safety precautions in place were already identified?

Henderson: Yes, and I think one of the really beneficial things that came out of the HIV epidemic is I think it caused us all to revisit sort of the whole concept of occupational risk. It really forced me to think about risk in a way I'd never thought about it before.

Saul: And the hospital already had a pretty good infection-control program.

Henderson: Yes. I was the hospital epidemiologist. That was my job at the time. And two nurse epidemiologists and a secretary, and we tracked all, both nosocomial infections and occupational infections that occurred in the building, looked for trends and clusters and looked for ways that we could make the environment better for patients and better for the staff.

Saul: And can you give me an example of things that you hadn't put into place already as a result of any incidences?

Henderson: Right. The first thing I did when we got here . . .

Saul: It was pretty new at that point.

Henderson: Yeah. Well, it was certainly new at the Clinical Center. We had visited the CDC's *Infection Control Guidelines* and looked at the things in the guidelines that made sense for us and developed, effectively, a manual for the hospital and tailored the CDC guidelines to meet sort of the needs of the Clinical Center populations. Well, it's in its eighth iteration, but it's all grown up. I mean, subsequently, we produced guidelines. Have you ever seen the flip chart that we have for the organization? Let's see if I can find one here. I may not have one. My office is currently a mess. Yes, I have an old one. So this hangs up on every nursing unit, and basically, this is almost everything you need to know about hospital epidemiology. And this is, I think 1998, and it's currently being revised. But if you just flip up, you can find, for strict isolation, and then you can find out what that placard looks like and what the diseases are that require strict isolation, and so on.

Saul: Okay.

Henderson: This has all come out of that program. I see the hospital epidemiology program as effectively being four things. One is looking at what's happening in the hospital on an ongoing basis to make sure that we're not having problems. Two, if we identify a cluster or outbreak, to investigate it and take measures to make it go away. Three is to educate the staff about the epidemiology of diseases in the hospital, the risk for transmission, and interventions that we know are effective in preventing transmission. That's probably the most important thing we do because it's primary prevention, basically. And fourth, I think we need to ask questions when we have the opportunity to push back the frontiers of science, and that's what you're asking about now, is just what we were doing. I mean, in part we did that study out of a defensive posture, because I knew the patients were going to be in the hospital, and I think the staff were very anxious about it, and I thought the staff would feel more comfortable about it if we were actively looking into it and being advocates for our staff, so that was the reason that we did that.

Saul: You were talking to Dr. Harden about working with Dr. Henry Masur about developing guidelines for those first, the first cohort of patients.

Henderson: Right.

Saul: Is that the same kind of guidelines?

Henderson: Well, it was, yes, basically. If you have a disease that clearly appears to be transmissible and you don't know the routes and risk for transmission, you start out being very conservative and then ease up as you learn, and I think we started out probably being a bit too conservative and then backed off that as we learned more about the epidemiology of the disease in the healthcare setting.

Saul: So, if you could describe for me the initial process.

Henderson: I think the very first patients were put in isolation, pretty rigorous isolation, and I think, in truth, I think that there was a lot of fear involved in care. I can't say enough about the staff that work here. They were willing just to pitch right in and take care of those patients, and that was just a way of life for us, and that was an anxiety-provoking time for everyone. And so we tried. My goal was to get to the staff every single piece of information that I could as quickly as possible. I felt like, as the hospital epidemiologist, if we told them first, before they heard it on channel 7, then they would have more confidence in us and would know that we were doing the best we could. The other part of that is for it to be known that we were giving them the straight scoop. I'll say this as cautiously as I can -- one of the major lessons I learned is that the press is not an educational organ. Its goal is not to educate. Their goal is to sell magazines and newspapers, and they don't, sometimes, care how. My favorite story, again -- please, not to print but just to put this in perspective for you, is that I had actually befriended a guy who worked for the Washington Post. He'd asked me so many questions and I'd given him so much grief that he called me periodically and asked me questions. I had to get in those days, clearance from the White House to say anything about HIV infection. So it has to go all the way to my boss, to the NIH boss, to the secretary, to the White House, and back, and then I could talk, because it was so controversial. And that makes perfect sense. The reason for that is that if there's one person who works for the federal government who's the right person to talk about this, you want to make sure that you have him talking and not some idiot, so that is not a problem for me. And I often ended up talking to this guy anyway. So one horrible -- I forget what day it was -- but one horrible day, he wrote a story that appeared on the front page of *T he Washington Post* saying that if you got blood on your hands from a patient who was infected with HIV, that you had a, I think it was like three in 100 risk or five in 100 risk of getting infected. It terrified people. It was wrong. And so I called him and said, "I'm so mad at you. Why didn't you call me?" And he said, "Well, I actually did try to call you and I couldn't get you, and we had a four o'clock deadline, and I just went with it." I said, "Well, you know, do you not care what you've done to the healthcare workers who work in this community?" He said, "You know, in the newspaper business, you have a choice between being first and being right, you choose to be first." And he said, "You know, I got my article on the front page of the *Post*, it got picked up by the *N ew York Times* and it's on the front page of the *New York Times*." I said, "Yeah, but it's wrong. It's dead wrong." And he said, "It doesn't matter to me."

So that's what -- that's the attitude we were sort of dealing with, and so I really made it my business to stay in touch with people in Atlanta, to try to stay on top of what was going on, and when I heard about something, I went just literally around the hospital and talked to people and let them ask me questions and told them what's coming, and then when they go home that night and watch the news, they'd see it on the news but they'd say, "Yeah, but that's not entirely right. Here's the real scoop," or "Here's this in perspective." So that was the goal. I mean, we were really connected to the staff at that time on those issues.

Saul: How did people react to this?

Henderson: I mean, I think with . . . I mean, I think they always wanted to know what was going on. I think it was frightening for them. It's a very normal reaction, I think. The Clinical Center's nursing staff is not your mother's nursing staff. They're an unusual set of folks. They're highly educated. They work in an environment that's really driven by science. It's the only one that's like this in the world. So their day-to-day job is science. It's not necessarily patient care. They provide terrific patient care, but it's getting us to a different product. And so they understood what we were about. They' re wonderfully well educated. The nurses, I think, are -- 99 percent of them have bachelor's degrees, 18 percent have master's degrees, and 1 to 2 percent have Ph.D.s, and that's the entire nursing force. It doesn't look like anybody else's nursing force. And they're a treat to work with. So, I mean, there were people who were very anxious. There were people who, after that, were worried. But in general, they were remarkable, and they did a great job.

Saul: Can you tell me a little bit about the results of the study? How did that evolve over time?

Henderson: So it became clear that the risk for transmission was small. It remains one of my favorite questions, actually. This is a blood-borne infectious disease. Why would it be that only three times out of 1,000, if you stick yourself with a needle contaminated with blood from somebody who's infected, that you get infected? It's a great question. And we probably have some insight into it now.

Saul: Three in a 1,000. Really?

Henderson: Yeah, it's that small. I mean, even going out now, although most people, I think most healthcare audience are knowledgeable about it, you still find audiences where people think that the risk may be as high as 70 or 80 percent. So when it became clear that it was a very small risk, some people began to think that it never happened. But then the next thing that happened is there were, as you might guess, there were several small studies that started, like ours, and most of them had no infections. Then there were a few anecdotal infections reported so healthcare workers who had an exposure, just one exposure, had a baseline sample drawn and then were found to be infected. So then you start thinking about those cases, and so I then started communicating with my colleagues from around the country and around the world, and I just kept a table of numerators and denominators, because whenever you heard a numerator, as a healthcare worker, it was very useful to have some sort of denominator to put with it. Okay? Because the press only reports the numerators. They don't tell you the denominator. So that table actually has served me well over the years, and I'm doing the same thing right now for hepatitis C. I'm tracking those data in the same way. And we're continuing to learn about the factors that influence risks for transmission of both those diseases. Keeping that in perspective, I mean, it was, I think it probably made it possible to do the work we were doing. As I' m sure Harvey told you, in 1988, we had an infection. That person was a participant in our study. And it was a traumatic event for a hospital. And I still take that seriously, actually. I mean, I think, in retrospect, there were things I hadn't even thought of that we might have done to make the place safer that we've now done, but it cost a life. That's not a trivial issue. And for a while, I used to see her walking around the hall, and that was the constant reminder that you have to keep your guard up.

Saul: And you probably felt somewhat responsible.

Henderson: Absolutely. I mean, you just always do. They're my chickens, these folks.

Saul: So what were the kinds of things, as your knowledge progressed and evolved about risk factors did you learn?

Henderson: Well, the hepatitis B model really seemed to be holding up, except the risk for transmission appeared to be way less, like two logs less than for hepatitis B. And so, following that model, in, I guess it was either late 1986 or sometime maybe around March of '87, I went to a meeting at CDC, where we really, as a group of about 40 people, drafted guidelines, which were initially called universal precautions and published.

Saul: You were part of that group?

Henderson: Mm-hmm. We had some of, by then, the best experience and way more data than anybody else. So if people said, "How do you know that mucosal splashes don't present the same level of risk?" or "How do you know that skin exposures?" no one else had those data. We had those data, and nobody else.

Saul: That brings me to the question, if we could just go on a tangent for a little bit.

Henderson: Sure.

Saul: I've talked to Dr. Klein about this, and part of my interest in looking at the NIH has been its role and relationship to other regulatory agencies, agencies that present guidelines -- the CDC and the FDA, for example, are the two prime ones -- and NIH has been a center of clinical research as scientific knowledge production has really been at the forefront of new research. And so when guidelines need to be drawn, NIH scientists are right there drawing up the guidelines with the regulators. And I'm wondering sort of, in this particular case, was it because there were more patients here than anywhere else, or because you guys had done the data collection?

Henderson: I think two ways. One is, I think that we were in front of the curve that we thought of the what-might-happen things before other people did. I think we designed a very good study. My good friend, Julie Gerberding, who is now the director of CDC, designed an almost identical study at San Francisco General. And around those two studies, we became the best of friends. I mean, she is one of my closest friends in medicine. And there weren't very many of what I would call comprehensive studies evaluating risk. So that's one way we got there. That may have been when I got to meet Julie, actually.

And, secondly, the CDC often calls NIH for science advice or calls on NIH, and in this instance I think they asked Dr. Fauci, who's the director of NIAID, and he knew that at the Clinical Center at NIH, we were the folks who probably had the most interest in these kinds of risks. So he asked me if I would go down there and represent both him and NIH. And subsequently, I've been 25 times on issues like this.

Saul: And is it the institutional affiliations between the two of you?

Henderson: Well, we belong to the same Public Health Service, and we belong to the same Department of Health and Human Services. But we have complementary missions, and I think it's terrific to work with the folks at CDC.

Saul: So tell me about this.

Henderson: It's a CDC process. It's a consensus process. The way it usually works is they start out with something, some document that they've drafted, and then they bring in almost every possible constituent. Again, it's a very political process, and it gets bogged down sometimes in politics. And if you ask me why I like living in Bethesda as opposed to Atlanta that would be why. And that covers the landscape from the American Association of Medical Colleges, the AMA, right down to the healthcare-worker unions and, so just the whole landscape. And then you listen to that. They create a draft based on what they've heard, and they start with a draft, modify it, and send it back out, take all the comments, and then at some level, depending on how controversial the guidelines are, they may even publish them in the *Federal Register* for an appropriate period of comment. Those I don't think were published, the universal precautions guidelines. There was, I think, near consensus at the table. Well, by the end of the conference. I mean, I think a lot of people didn't know what the data said. Once you see what the data said, it made pretty much sense.

And point of fact, this is one of those -- this is a wake-up call for healthcare. And we should have been taking those precautions since the 1950s, when the risks for transmission of hepatitis B or -- well, it used to be called serum hepatitis in those days -- was identified. People ignored that. I mean, and the irony that the transmission of HIV has been on the cover of *Newsweek* 15 times, and way more people, more healthcare workers, have died of hepatitis B transmission -- never been on the cover of *Newsweek*. It's not going to happen. Probably right after the marketing of the hepatitis B vaccine, there were probably still someplace in the neighborhood of 250 to 350 healthcare workers dying every year in the United States of the complications of occupational infection with hepatitis B, but not a single death, at that point, from HIV. So the real lever for this was to take risk and look at it and say, "Look, boys and girls, we've just been doing this wrong." And I'm old enough that I took my training before anybody thought about that, and I remember being bathed in blood and not even thinking about it. My favorite story that I told -- I think I told Vicky Harden -- is, when I was in medical school, I went into the operating room -- when I was just, I think, a sophomore medical student, we got to go in the operating room one time -- and the surgeon was doing an esophagogastrectomy, and he cut a major artery and squirted blood over everybody in the operative field, and I wore those greens around the rest of the day thinking that I was a macho man, you know, that I'd really arrived in medicine, this blood sprayed all over me. No one told me to go wash it off. No one ever took that seriously.

I remember managing patients in a county hospital, where I did my training, with a fulminant hepatitis B infection, no gloves, no nothing; one patient that was encephalopathic I remember just throwing blood all over the room. It's a miracle I'm not infected. So it forced us to think about that, and that's probably saved an enormous number of lives.

Saul: What did they look like from the beginning?

Henderson: From the beginning . . . They've really not been modified much. They mostly were common-sense guidelines. I still think, not because I had a hand in writing them, but I still think they're the best set of guidelines that have ever been written by CDC. They were very thoughtful guidelines. They basically said to healthcare workers, "Look, the primary risk here is blood. You need to have a barrier between you and the patients' blood no matter who the patient is or no matter what you think they have. And if you're about to do something where you think" -- and this was the best part of them, I think, and we'll have to go off the record here in a second and talk about the second half of this -- "If you as a healthcare worker have got to do something where you think there's a risk for getting blood on your hands, you ought to be wearing gloves. If you're about to do something where you think there's a risk for spattering or splattering of blood, you'd better protect your mucus membranes, period." Put the healthcare worker in the driver's seat, said that you could actually use your brain matter and make a decision, and that you ought to be the decider. So you and I don't necessarily do everything the same way.

And the best example is simple venous phlebotomy, drawing blood from a patient. I mean, I don't know how many times I've drawn blood in my life. I don't think I've ever gotten blood on my hands from a patient, drawing venous blood. From my own perspective now -- this is not from my Public Health Service perspective -- it doesn't make any sense for me to wear gloves to do routine venous phlebotomy. There's no risk. Or the risk is so small that it may actually increase the risk of me sticking myself or doing something else for the loss of tactile sense that you get when you wear gloves. On the other hand, when I start an IV, put a catheter in, I put the catheter in and occlude the vein, so it doesn't bleed back, with my fourth finger, take the stylet out, put the stylet over here, and hook up the IV tubing to it. But I'm just insecure enough that I want to be sure that it's still in the vein, and so I let up, and when you do that and hook this up, the blood bleeds back into the thing. You get a drop of blood on your hand every time. So when I do that, I will always be wearing gloves.

So it was that kind of sensibility that those guidelines had. And I think people really connected with that and started thinking about what they were doing in the healthcare setting. And if you found yourself in a set of circumstances where you got blood all over your hands, you said, "Why in the hell did this happen?" and then the next time you didn't do it. And I think that's how risk reduction actually happened. And included in those guidelines is a whole series of recommendations about the safe handling of sharp objects, managing needles and other sharp objects in the healthcare setting. And what we did coming out of that, in this institution, is to start processing through all of those exposures, looking for sort of epidemiological similarities, looking at what sorts of things are associated with risk, what common circumstances, and then looking for either devices or procedures or anything that we could do that would reduce the risk. And we've almost made those exposures go away in this building. I could show you data that'll knock your socks off. It's really impressive.

But we are -- we don't have a lot of things in common with some of outside places. We're not understaffed. It's a very cerebral group. They understand the stuff at the fundamental level, and they connect with you. The hospital in itself, if you think about it in this way, is a great laboratory to do proof of principle.

Saul: Oh, sure.

Henderson: It's not just proof of science principle, it is proof of these kinds of principles as well. So if you have everything in place, you make this work. And so those guidelines had that. In the *Morbidity-Mortality Weekly Report* in August of 1987 as a supplement. I can give you the precise reference if you want it. And it's entitled "Universal Precautions". What those guidelines didn't take into consideration, they were entirely designed, I think, to prevent transmission of blood-borne pathogens from patients to healthcare providers, and they didn't take into consideration the potential for transmission of other things on the hands of healthcare workers, like bacteria, for example, to patients in the same way. And as they got revisited downstream -- and that would have been probably in the early 1990s sometime -- we got to the concept of standard precautions. I wish they had never renamed the precautions because I liked the concept of universal precautions. But since that name was already taken and then they were doing this other thing, they called them standard precautions. So now CDC refers to these as standard precautions. But that was really sort of a subtle change and really not terribly substantive. The basic tenets of risk were the same in both sets.

Saul: And what kinds of things did you find that you could do in this hospital to reduce the risk of exposure?

Henderson: Well, implementing universal precautions, just going out and training folks and telling them the stuff we had, and then monitoring. We asked the staff, before we trained them -- this was another one of those studies that we published -- we asked the staff, before they trained them, how often they got blood on their hands and what they were doing when they did that. Then we trained them. Then we waited 18 months for the training to wear off and to get back to business as usual, and then we went back and asked them again how often they were getting blood on their hands. And basically, the good news was that it reduced the number of skin exposures to blood in the hospital by 50 percent. The bad news is that 50 percent of a big number is still a big number. So we were still having lots of skin exposures, and we still do. And then the other thing we did was, as I said, we put together this team of folks who have worked diligently over the last 15 years to really try to make parenteral exposures, the highest-risk exposures, go away. And if that involved safer devices or if that involved changing procedures or involved whatever, we just did that, and then we would go around the hospital and educate folks about the risks, and here's the number-one circumstance. So, for housekeepers, we had cardboard needle-disposal containers, and the needles were always breaking through the sides and they were always getting stuck. So we got a different kind of container. And then we discovered that people overfilled those, so we had to go back and figure that out. So just, it's been a continual improvement process over the years, and we collected the data systematically, and it just goes like this, in this building. It's really quite remarkable.

Saul: Now, you guys had so much success for various reasons, partly because of the kind of place it was, you weren't understaffed, the kind of nursing staff you had, the ways that paid attention to the data being collected. Did the things that you learned here and the things that worked here get translated to other places?

Henderson: Absolutely, absolutely. I mean, I think certainly not everyplace. I mean, if you have 42 patients who are acutely ill and three nurses, it's not going to work because they're just running like crazy. But if you have an adequate staff… A lot of the tenets -- and you can ask questions here: does this certain device reduce the rate of injuries in your institution from that device? The answer is yes. Now, you assume when you do such a study that the person uses the device right. If there's a safety thing, they actually engage it; if they do all the other things. Well, not everyplace do they do that. But it shows. And so it provides a data set for people to draw from.

I think some of our early studies are very highly quoted and cited, and I think that that's -- it's useful in that respect. That's what this place is all about.

Saul: Is it because it was at NIH that the studies are quoted?

Henderson: Well, I don't know. I think sometimes just the study itself. I mean, I think a bad study from NIH is not so likely to be quoted, but I think a good study from NIH may be more likely to be quoted than a good study from some back swamp, for example.

Saul: In the beginning, were there separate guidelines to prevent transmission of a patient as opposed to the transmission?

Henderson: No, there weren't.

Saul: Was that a problem at all?

Henderson: No. I mean, I think that it was then, and still remains, almost a theoretical risk. This is a highly political issue and you have to be very careful how you write about this. But to date, there's the Florida dentist -- all right? -- there's an orthopedic surgeon in France, and there's one other case. We've been doing this a long time. There have been lots of look-back studies. That risk is very small. And if you think about it, it sort of makes sense because these risks are multiplicative. If it's a three-per-1,000 risk per parenteral exposure, then you have to have one. Right? You have to actually leak blood into a patient, and the risk of that is calculable, and you can calculate that out. CDC actually did that. For mental calculus, I'm not sure it has any relevance. The estimate for transmission to a patient in those models is someplace between one per 250,000 procedures to one in a million. All right? Most surgeons don't do 250,000 procedures in a lifetime. But the bumper sticker says, you know, stuff happens, and so they happen as anecdotes. And, interestingly, for this one thing, society would really like zero risk.

Saul: There are a lot of things that society would like zero risk.

Henderson: And zero risk doesn't exist. It's not out there; it's not a choice. In the laundry list of things you can choose, that's not on the list. So no matter what we do, we'll never get to zero. And the question is can we do things that make sense intellectually, that make sense from a cost perspective and from a human-rights perspective that actually will reduce that risk appreciably? And the answer is no. I don't think. We'll see, but I don't think so. For a disease that's transmitted at a much higher rate, then you have to because you find it. But this, we're not seeing a lot of these cases.

And there were a set of guidelines published, I think, and I think its October of 1994, also in the MMWR, I also had a chance to contribute to those and that talks about management of healthcare workers who are infected with a disease. And that followed the Florida dentist.

Saul: With the first cohort of patients sort of in the early days or years, what kinds of precautions did you take yourself, and were those any different from other people?

Henderson: No. I took just the precautions. We were practicing what we actually called blood and body-fluids precautions, and CDC called it blood and body-fluids precautions for a while. They're no longer called that, but that's what looked like it was the risk. And, I mean, if I were drawing blood from somebody, I wear gloves.

Saul: And speaking of phlebotomy procedures, one of the things that I'm interested in looking at is the OSHA regulations that were developed that said the risk of infection from drawing blood is different than standard occupational exposure to blood and body fluids, and they're different. That's the only exemption of an occupational worker for exposure to blood products.

Henderson: That's in part because of me.

Saul: Okay. That's what I wanted to know.

Henderson: So the person is Barbara Baird, who worked for the Nursing Department, and then I think either worked for Dr. Masur or maybe Dr. Lane or maybe both of them at one time or another. But she was sort of intimately involved from the bedside perspective and would remember vividly, I think.

The other person that you might want to speak with is Christine Grady, who is now in our Bioethics Department.

Saul: Grady?

Henderson: Grady, G-r-a-d-y. And Chris was, I think, the nurse educator or nurse specialist -- I can't remember what her real job was -- in NIAID, working with the NIAID docs at the time, and she's terrific. She's now a Ph.D. bioethicist, but she gave a great lecture on immunology and was very connected to this, but would have understood, I think, at a very fundamental level what was going on and will have great perspective about that.

Saul: I think that's about all I have. What concerns exist now in terms of epidemiology in the hospital, tracking rates of transmission?

Henderson: Well, let's see. I think we still need to have a better understanding of the early events in infection and pathogenesis of infection. I want to understand the three-per-1,000 number and be able to tell you why three or which three. To date, we can't do that. We administer post-exposure chemoprophylaxis to all thousand, but only three need it. The drugs are associated with risk as well, and I worry about that. There's a suggestion that simultaneous exposure to hepatitis C and HIV may convey different levels of risks, and I'd like to understand that. I worry a lot about hepatitis C exposures in the hospital. That's a separate issue entirely. And sort of for double infections, that's the set. I actually also don't want to let our guard down. I think we've learned to behave better, but changing folks' behavior is a difficult process. I think that most people who work even in academic settings don't understand how to do that. I surely don't. And I think sort of connecting with the behavior and trying to understand what we can do to make the environment safer would be the next step up. There are lots of things left to do.

Saul: Well, thank you very much.

Henderson: Oh, it's my pleasure.

END OF INTERVIEW